

REMARKS

Claims 1-14 are pending in the present application. Claims 1-2 and 8-9 were canceled; claim 14 was amended to correct an informality. Reconsideration of the claims is respectfully requested.

Amendments were made to the specification to correct errors and to add proper reference to related applications. No new matter has been added by any of the amendments to the specification.

I. 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claims 1-2 and 8-9 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter, which applicants regard as the invention. Claims 1-2 and 8-9 have been cancelled.

II. 35 U.S.C. § 103, Obviousness

The examiner has rejected claims 3-7 and 10-14 under 35 U.S.C. § 103(a) as being unpatentable over Suzuki (U.S. Pat. 6,134,078) in view of Cain et al (U.S. Pat. 5,493,467). This rejection is respectfully traversed.

As per claims 3-7 and 10-14, the office action states:

Regarding claims 3 and 10, Suzuki discloses a sensor apparatus (figure 1), comprising:
a first sensor 16;
a second sensor 15; and
at least one flux guide 13, wherein a flux generated by the at least one flux guide is shared between the first sensor and the second sensor to thereby reduce a sensitivity of the sensor apparatus (column 1, lines 27-28).

Regarding claims 4 and 11, it is inherent in the reference that by sharing the flux between the first sensor and the second sensor it reduces a flux injection efficiency of the sensor apparatus.

Regarding claims 5 and 12, Suzuki discloses that the at least one flux guide includes a top flux guide 13 and a bottom flux guide 12.

Regarding claims 6 and 13, Suzuki discloses that the top flux guide 13 is positioned between the first sensor 16 and the second sensor 15, and

the bottom flux guide 12 is positioned nearest a side of the second sensor that is furthest away from the first sensor.

Regarding claims 7 and 14, Suzuki discloses that the second sensor is positioned on the planars (the planars in this particular case would be the layer between sensor 15 and flux guide 12, Column 3, lines 17-20).

Suzuki does not specifically disclose that the MR sensors are spin valve sensors. Cain et al discloses a yoke spin valve MR read head (figure 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the reduced sensitivity sensor apparatus of Suzuki with the spin valve sensors as taught by Cain et al.

The rationale is as follows: Cain et al. utilize a spin valve sensor in the yoke type read head with the purpose of taking advantage that the magnetoresistance is not dependent on the relative direction of the sense current. One of ordinary skill in the art would have been motivated to provide the reduced sensitivity sensor apparatus of Suzuki with the spin valve sensors as taught by Cain et al. as it would eliminate the dependency on the direction of the sense current.

1. **Suzuki does not teach or suggest the claimed limitation of, "wherein a flux generated by the at least one flux guide is shared between the first spin valve sensor and the second spin valve sensor...."**

It is respectfully submitted that the Suzuki reference does not teach or suggest the limitations of claim 3, particularly, "wherein a flux generated by the at least one flux guide is shared between the first spin valve sensor and the second spin valve sensor...."

Claim 3 is reproduced for purposes of discussion:

3. A spin valve sensor apparatus, comprising:
 - a first spin valve sensor;
 - a second spin valve sensor; and
 - at least one flux guide, wherein a flux generated by the at least one flux guide is shared between the first spin valve sensor and the second spin valve sensor to thereby reduce a sensitivity of the spin valve sensor apparatus.

Examiner cites Suzuki at col. 1, lines 27-28. That section and surrounding text states:

Conventional IIR heads are divided into two types including a type wherein a magnetoresistive element is disposed just above an air bearing surface and directly detects a magnetic flux generated from the magnetic recording media, and the other type wherein an MR element is disposed at a distance from an air bearing surface and detects a magnetic flux generated from the magnetic recording media by way of a magnetic yoke. While the latter type is inferior in reproducing sensitivity to the former type, it is superior in that it is high in reliability since the MR element is not exposed to the air bearing surface.

This passage depicts two types of MR sensors. First, one where the MR element directly senses flux from the media, and the other where the MR element is disposed from an air bearing surface and detects a magnetic flux generated from the magnetic media by way of a magnetic yoke.

This passage does not appear to teach or suggest the claimed limitation of claim 3, namely, "at least one flux guide, wherein a flux generated by the at least one flux guide is shared between the first spin valve sensor and the second spin valve sensor to thereby reduce a sensitivity of the spin valve sensor apparatus."

This claim language depicts flux being shared between two sensors to thereby reduce sensitivity of the apparatus. Though the cited passage does mention "inferior" sensitivity, it does not cite that this sensitivity is produced by sharing flux between two sensors.

Later, in the description of FIG. 1 of Suzuki, at col. 1, lines 39-46, Suzuki mentions a shared yoke between two sensors, but the recited apparatus is depicted as having a "high reproducing sensitivity," not a reduced sensitivity:

In the MR head, back yoke 14 is coupled magnetically to MR element A 15 and MR element B 16, and terminals 17 are connected to MR element A 15 and MR element B 16 while intermediate terminal 18 is connected to an intermediate point between MR element A 15 and MR element B 16 in order to assure a high reproducing sensitivity with a differential structure.

[Emphasis added.]

Hence, it is respectfully submitted that Suzuki fails to teach or suggest the elements of claim 3.

2. There is no motive for the combination of Suzuki and Cain, and the combination does not teach the claimed invention.

Further, it is respectfully submitted that the combination of Suzuki and Cain is not proper. Examiner proposes combining Suzuki with Cain, stating that,

...It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the reduced sensitivity sensor apparatus of Suzuki with the spin valve sensors as taught by Cain et al.

The rationale is as follows: Cain et al. utilize a spin valve sensor in the yoke type read head with the purpose of taking advantage that the magnetoresistance is not dependent on the relative direction of the sense current. One of ordinary skill in the art would have been motivated to provide the reduced sensitivity sensor apparatus of Suzuki with the spin valve sensors as taught by Cain et al. as it would eliminate the dependency on the direction of the sense current.

However, it is respectfully submitted that the proposed motivation would not motivate one of ordinary skill in the art to create the present invention.

The present invention is directed to a reduced spin valve sensor. The specification describes the invention at page 4, lines 19-27:

While GMR sensors, also known as Spin Valve sensors, have increased the sensitivity of read heads of disk drives thereby allowing for advances in the recording density in magnetic disk recording technologies, it would be beneficial to be able to apply the spin valve sensors to other magnetic media, such as magnetic tape media. However, the differences in performance of recording on magnetic tape and recording on magnetic disk media prevent the simple application of spin valve sensors to magnetic tape media.

However, neither Suzui nor Cain are directed to a reduced sensitivity sensor. Suzuki is directed to a "High sensitivity low distortion yoke-type magnetoresistive head," while Cain is directed to a "Yoke spin valve MR read head." Neither reference appears to teach or suggest the idea of reducing spin valve head sensors, and particularly they do not appear to teach or suggest reducing sensitivity of a spin valve sensor by sharing flux from a flux guide between first and second spin valve sensors, as claimed in at least claim 3. Therefore, it is respectfully submitted that the combination of Suzuki and Cain is not proper, and even if they are combined, they do not teach or suggest the present invention.

Claim 10 is rejected under the same rationale as claim 3. Therefore, it is respectfully submitted that claims 3 and 10 are hereby distinguished from the cited references. Similarly, claims 4-7 and 11-14 are also thereby believed distinguished from the cited references, by virtue of their dependence on allowable claims.

Several of the dependent claims are also believed allowable on their own merits. For example, claim 4 claims, "wherein the sharing of the flux between the first spin valve sensor and the second spin valve sensor reduces a flux injection efficiency of the spin valve apparatus." Examiner rejects this claim stating, "...it is inherent in the reference that by sharing the flux between the first sensor and the second sensor it reduces a flux injection efficiency of the sensor apparatus."

However, neither reference appears to teach or suggest that flux injection efficiency is reduced in a spin valve apparatus, nor that such efficiency is reduced by sharing a flux between first and second spin valve sensors.

Therefore, at least claim 4 is believed distinguished from the cited references.

Therefore, the rejection of claims 3-7 and 10-14 under 35 U.S.C. § 103(a) has been overcome.

III. Objection to Claims

The Examiner has objected to claim 14 because of informalities. The informalities have been corrected according to Examiner's suggestion.

IV. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

DATE: 10.9.03

Respectfully submitted,



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